



# NASA's Development of Commercial Low Earth Orbit

NAS CBPSS Panel

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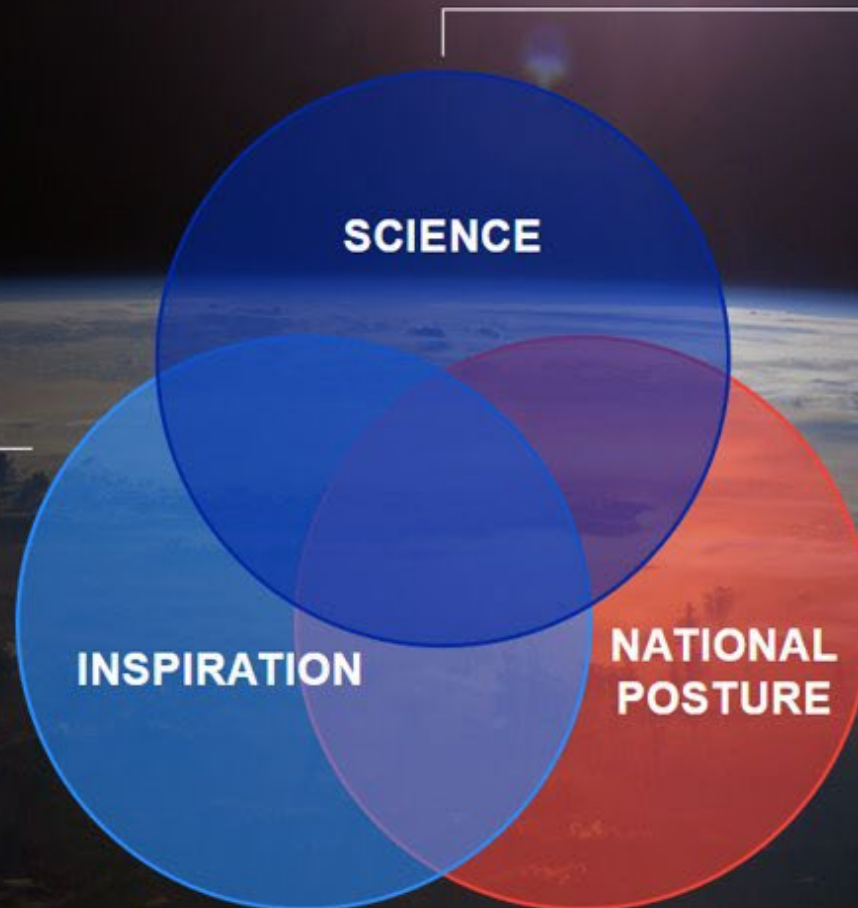
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# WHY GO?

## BENEFITS TO HUMANITY

The pursuit of exploration yields invaluable scientific discoveries, serves as a catalyst for global cooperation, and inspires future generations to dream big.



# COMMERCIAL LEO DESTINATION STRATEGY

| 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|------|------|------|------|------|------|------|------|------|------|------|------|
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Goal for CLD Initial Capability ▲ Planned ISS Deorbit ▼

International Space Station (ISS) Operations

CLD Operations

Transition Period

CLD Phase 1: Design Maturation

Commercial Destinations for ISS (CDISS)  
*Axiom Space*

2-year Option

Commercial Destinations Free Flyer (CDFF)  
*Blue Origin & Sierra Space Orbital Reef*

Commercial Destinations Free Flyer (CDFF)  
*Nanoracks & Voyager Space Starlab*

CLD Phase 2: Certification and Services

NASA Certification of CLD(s) and Purchase Services  
*Full and open competition, one or more awards*

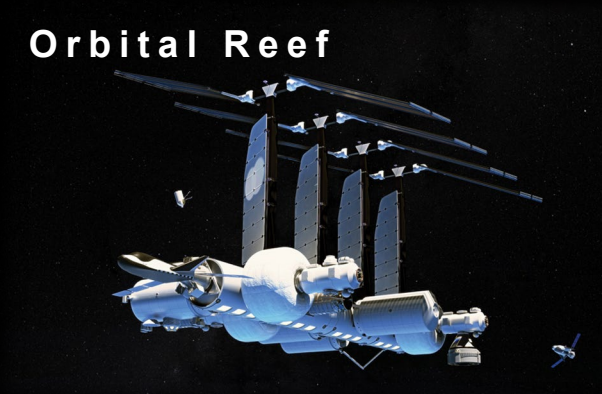


## FUNDED PARTNERS

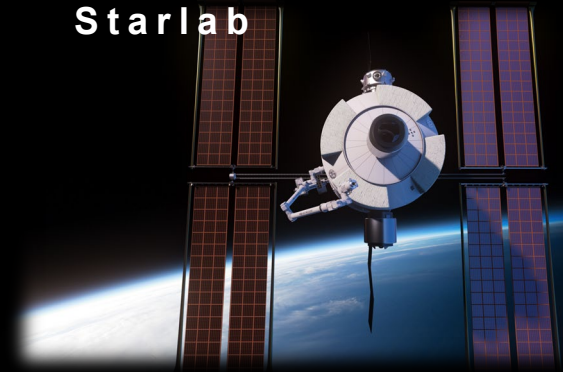
Axiom Station



Orbital Reef



Starlab



## CCSC-2 PARTNERS

Blue Origin



Sierra Space



SAS



Vast Space



Northrop  
Grumman



SpaceX



ThinkOrbital





## International Space Station (ISS) Operations

Planning for some overlapping ISS to CLD operations  
Final ISS Deorbit January 2031

Operational

Steady state

## Commercial Cargo and Commercial Crew Operations

Northrop Grumman Cygnus and SpaceX Cargo Dragon certified cargo transport  
Sierra Space Dream Chaser cargo certification in work  
SpaceX Crew Dragon Certified  
Boeing Starliner certification in work

Operational

Steady state

## Commercial LEO Destinations Phase 1 – Design Maturation

Axiom Space Station developed under CDISS to attach to ISS  
Blue Origin Orbital Reef free flyer developed under funded SAA  
Nanoracks Starlab free flyer developed under funded SAA

Funded  
SAAs and  
CDISS  
contract in  
work

CDISS awarded – 2020  
CDDF awarded – 2021

## Collaborations for Commercial Space Capabilities – Early Design

Partnered with seven U.S. companies to advance commercial space-related efforts through NASA contributions of technical expertise, assessments, lessons learned, technologies, and data.. Vast, SpaceX and Sierra Space developing CDDF Concepts

Unfunded  
SAAs kicking  
off

CCSC-2 awarded 2023

## Commercial LEO Destinations Phase 2 – Certification and Services

NASA Certification of CLD(s) and Purchase Services  
Full and open competition, one or more awards

Acquisition  
Strategy  
Formulation  
and  
Planning

Phase 2 RFP 2025  
Award 2026







## PHASE 2 PLANS

- Phase 2 will focus on the certification of CLDs and the purchase of services
- NASA is planning for the Phase 2 service contract award(s) to be in the 2026 timeframe, with a Request for Proposals (RFP) being issued in late 2025
- Phase 2 solicitations will be free and open competitions, accessible to any US company to propose
- Any company meeting the requirements within the RFP can propose even if they did not have a Phase 1 contract or agreement with the agency

### CLDP Utilization Requirements TIM

- June 11<sup>th</sup> and 12<sup>th</sup>, 2024
- 90+ persons in attendance
- 22 different companies
  - 5 of which were CLD Partners
- 2 International Partner Reps Present
- Data available on Sam.gov
- <https://sam.gov/opp/2216784018c74ae88840cf90eef24f11/view>

### CLDP Safety Requirements TIM Part 1

- August 13<sup>th</sup> and 14<sup>th</sup>, 2024
- Part 2 to take place in October

### Commercial Space Food TIM

- September 25<sup>th</sup> and 26<sup>th</sup>, 2024
- CLD Partners and Commercial Food Industry invited





## REQUIREMENTS DEVELOPMENT

To support the upcoming procurement, NASA has been concentrating on developing the key requirements needed on future LEO platforms

### Utilization Requirements

- Basic Laboratory Capabilities
- Beyond Basic Laboratory Capabilities
- Requirements to Ensure NASA Heritage Express Rack Can Be Accommodated

### Human Rating Requirements

- Flow down NASA Human Rating Requirements to CLDs
- Requirement to follow a systematic safety review process

### Key Governing Requirements Documents include:

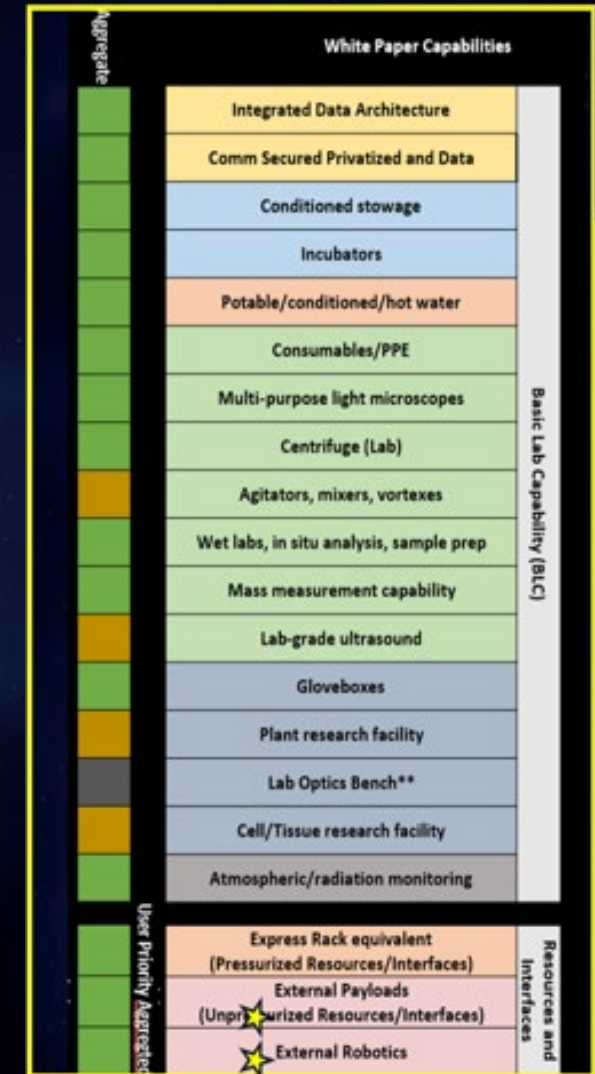
- CLDP-REQ-1130: Requirements and Standards for the Commercial LEO Development Program
- CLDP-REQ-1150: Operational Requirements and Standards

***Note: NASA is utilizing the Request for Information process and providing draft documents via [sam.gov](https://sam.gov)***



## What are Basic Laboratory Capabilities?

- Basic Laboratory Capabilities – are a draft set of capabilities for a LEO destination that are agreed to be essential for the development of NASA science and technologies. This set was designed to include multiple NASA sponsors and represent capabilities that were also of interest to OGAs and commercial researchers.
- Other laboratory capabilities may be needed; however, these will be defined outside the Basic Laboratory Capabilities.



**Who are the CLDP integrated Users for CLD Services?**

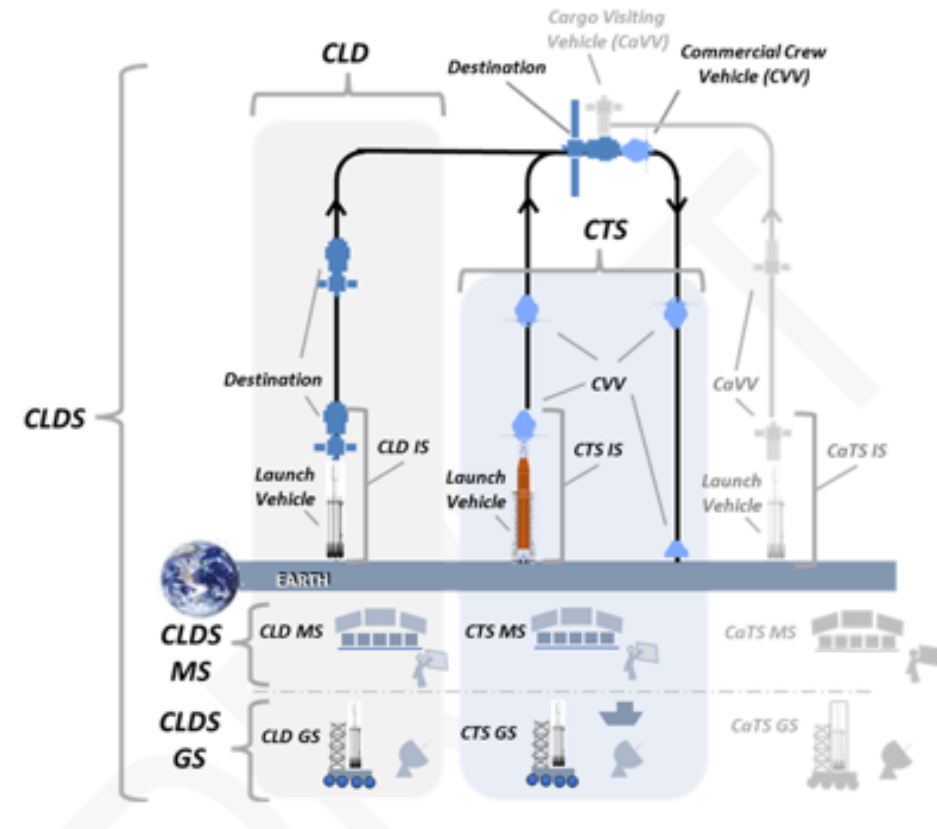
- **NASA's Human Research Program**
- **NASA's Science Mission Directorate**
- **NASA's Space Technology Mission Directorate**
- **NASA's Exploration Systems Development Mission Directorate**
- **NASA's Office of STEM Education**
- **Other Government Agencies (OGAs) and other users by way of a future microgravity Institute**
- **CLDP and other NASA spaceflight programs.**



# Draft Utilization Requirements

- Conditioned Stowage
- Gloveboxes
- Microscopy
- Plant Research
- Pressurized Payload Resources
- Unpressurized Payload Resources
- Data Management and Comm
- Lab Equipment and Supplies
  - Biological and Physical Centrifuge
  - Ultrasound
  - Laboratory Optics Bench
  - Sample Collection Equipment
  - Basic Utilization Consumables
- Environmental Monitoring
- Other Applicable Requirements

Requirements from CLDP-REQ-1130 are shown for feedback



All requirements are considered draft and subject to change prior to final RFP release